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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/644,867	08/21/2003	Toshiaki Asada	116176	7049
25944	7590	07/25/2005	EXAMINER	
OLIFF & BERRIDGE, PLC P.O. BOX 19928 ALEXANDRIA, VA 22320			RIDDLE, KYLE M	
			ART UNIT	PAPER NUMBER
			3748	

DATE MAILED: 07/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b> 10/644,867	<b>Applicant(s)</b> ASADA, TOSHIKI	
	<b>Examiner</b> Kyle M. Riddle	<b>Art Unit</b> 3748	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 April 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>04052005</u> . | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

***Response to Amendment***

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-3, 9, 13, and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Ozawa (U.S. Patent 5,682,854).

Ozawa discloses a variable compression ratio engine comprising:

- changing the phase of the intake valve 33 and exhaust valve 35 (column 8, lines 21-23);
- determining whether to improve fuel consumption by increasing a compression ratio and determining cylinder chamber pressure, maximum allowable pressures, and compression ratios (column 1, lines 40-47, column 8, lines 60-63);
- opening and closing the exhaust valve 35 in the vicinity of bottom dead center after the intake stroke and after the intake valve 33 closes near bottom dead center to improve fuel consumption (column 8, lines 57-63);
- improving fuel consumption on the basis of load, compression ratio, and torque (column 7, lines 56-59).

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-22 are rejected under 35 U.S.C. 103(a) as being obvious over Ozawa (U.S. Patent 5,682,854).

Ozawa discloses a variable compression ratio engine comprising:

- changing the phase of the intake valve 33 and exhaust valve 35 (column 8, lines 21-23);
- determining whether to improve fuel consumption by increasing a compression ratio and determining cylinder chamber pressure, maximum allowable pressures, and compression ratios (column 1, lines 40-47, column 8, lines 60-63);
- opening and closing the exhaust valve 35 in the vicinity of bottom dead center substantially after the intake stroke and after the intake valve 32 closes near bottom dead center to improve fuel consumption (column 8, lines 57-63);
- improving fuel consumption on the basis of load, compression ratio, and torque (column 7, lines 56-59).

Re claims 1-3, 9, 13, 14, 21, and 22, Ozawa fails to exactly disclose the opening and closing of the exhaust valve after an intake stroke. Figure 14 of Ozawa shows only a minimal overlap of curve B21 corresponding to intake valve 32 and curve C2 corresponding to exhaust valve 35, and it would have been an obvious choice well within the design of the invention by Ozawa and to one of ordinary skill to shift the exhaust valve opening and closing slightly to the right completely after an intake stroke of intake valve 32 depending on desired compression and timing characteristics.

Re claims 4 and 15, Ozawa fails to disclose specifically adjusting the lift amount of the exhaust valve. Ozawa does teach phasing of the exhaust and intake valves (column 8, lines 20-23), and it is well known in the art that phase changing can consist of altering the lift as well as the timing of the engine valves, and it would have been an obvious choice to one of ordinary skill to apply this characteristic to the valve changing mechanism of Ozawa depending on system requirements, computational considerations, etc.

Re claims 5-8, 10-12, 16-20, Ozawa fails to disclose admitting the exhaust gas into the combustion chamber in a stratified state or the opening/closing of the exhaust valve to equalize the exhaust passage and combustion chamber pressures. The equalization of pressures between the combustion chamber and exhaust passage in order to produce the necessary recirculation flow of exhaust gas is a matter of obvious choice to one of ordinary skill in the art to produce the desired compression ratio effects, and the stratification of exhaust gas recirculation is also well known in the art to produce efficient burning of the gases and lean combustion.

### ***Response to Arguments***

5. Applicant's arguments filed 28 April 2005 have been fully considered but they are not persuasive.

6. Applicant argues on page 8, bottom of the page, that the opening and closing of the exhaust valve 35 do not occur after the intake stroke. As detailed above, Figure 14 shows only an insubstantial overlap that can obviously be eliminated. Also, pertaining to exhaust valve 35 being opened and closed during the intake valve 33 operation on page 9, top of the page, the claims only state that the exhaust valve must be opened and closed after an intake stroke, which is interpreted by the examiner in its broadest sense to include the exhaust valve 35 opening after

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the opening and closing of the one intake valve 32. Also, the examiner made an error in the last office action, paragraph 3, by incorrectly identifying the exhaust valve 35 opening and closing after intake valve 33 closes, instead of the correct intake valve 32, which may have caused some confusion. As for the arguments concerning claims 5 and 10 on the bottom of page 9, the examiner's position is as described above in that exhaust valve 35 is opened and closed after an intake stroke of intake valve 32.

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

### ***Conclusion***

8. The IDS (PTO-1449) filed on 5 April 2005 has been considered. An initialized copy is attached hereto.

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure and consists of 3 patents.

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- Hu (U.S. Patent 5,537,976) discloses a four-cycle engine with compression release breaking and a separate opening of an exhaust valve after an intake stroke.

- Meistrick (U.S. Patent 6,012,424) discloses an engine braking technique with a separate exhaust valve opening after an intake stroke.

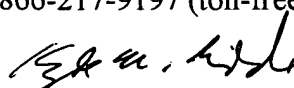
- Whiting et al. (U.S. Patent 6,347,619) disclose an exhaust gas recirculation system with a secondary exhaust valve being opened after an intake stroke.

*Communication*

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kyle M. Riddle whose telephone number is (571) 272-4864. The examiner can normally be reached on M-F (07:30-5:00) Second Friday Off.

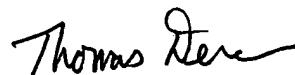
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Denion can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Kyle M. Riddle  
Examiner  
Art Unit 3748

kmr



THOMAS DENION  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 3700